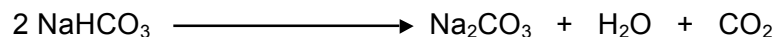


## Reacting Masses

- 1 A solid called sodium hydrogencarbonate is heated in an oven. It forms carbon dioxide gas as shown by the equation below.



A spoonful of baking soda contains a mass of 22 g of sodium hydrogencarbonate.

Calculate the mass of carbon dioxide that could be made from 22 g of sodium hydrogencarbonate.

Show clearly how you work out your final answer.

Relative atomic masses: H = 1; C = 12; O = 16; Na = 23.

$$168 \longrightarrow 44 \text{ [1 mark]}$$

$$1\text{g} \longrightarrow 44/168 \text{ [1 mark]}$$

$$22\text{g} \longrightarrow 5.76\text{g} \text{ [1 mark]}$$

168 is the formula mass for  $\text{NaHCO}_3$   
44 is the formula mass for  $\text{CO}_2$   
so if 168 goes to 44, then 22g goes to  
 $22 \times 44/168$

$$\text{Mass of carbon dioxide} = 5.76\text{g} \quad \text{g} \quad (3 \text{ marks})$$

- 1 (a) Limestone ( $\text{CaCO}_3$ ) is a raw material. On strong heating it is converted to calcium oxide, which is a very useful substance.



- 1 (a) (i) Calculate the formula mass (Mr) of calcium carbonate.

$$40 + 12 + 48 \text{ [1 mark]}$$

$$\text{Mr of calcium carbonate} = 100 \text{ [2 marks]} \quad (2 \text{ marks})$$

- 1 (a) (ii) Calculate the mass of calcium carbonate needed to make 30 tonnes of calcium oxide.

$$100 \longrightarrow 56$$

$$30/56 \times 100 \text{ [1 mark]}$$

You can use the method from the video, or another method that you have learnt as long as it works for you!

$$\text{Mass of calcium carbonate needed} = 53.57 \text{ [2 marks]} \quad \text{tonnes} \quad (2 \text{ marks})$$

**(Total 7 marks)**